Approved XX/XX/XX

Draft June 26, 2001

U.S. Environmental Protection Agency
Science Advisory Board
Committee: Advisory Council on Clean Air Compliance Analysis (Council)
Health and Ecological Effects Subcommittee (HEES) Teleconference

Summary Minutes of Public Teleconference
Date: June 25, 2001

Committee Members: (See Roster - Attachment A.)
Date and Time: 1 pm to 3 pm, June 22, 2001 (See Federal Register Notice - Attachment B).
Location: Ariel Rios North, Conference Room 6013
Purpose: The purpose of the call is to provide HEES members with the opportunity to review the Agency's proposed approach to assessment of health and ecological effects for the Second Prospective Study of the Benefits and Costs of the Clean Air Act, 2000-2020 and develop a draft response for the July 9-10, 2001 meeting of the Council on those issues.
Attendees: Chair of the HEES: Dr. Paul Lioy; COUNCIL Members: Ms. Laurie Chestnut, Other SAB Members participating: Drs. Philip Hopke and Mort Lippmann; SAB Consultants: Michael Kleinman, Tim Larson, Joseph Meyer, and George Taylor. SAB Staff: Dr. Angela Nugent, Designated Federal Official, and Ms/ Rhonda Fortson. Other Persons Attending: Mr. James DeMocker and Dr. Bryan Hubbell (EPA, Office of Air and Radiation); Dr. Frank Arnold; Mr. Josh Habib (IEc); Dr. Donald McCubbin (Abt); Dr. Jim Neumann (IEc); Dr. Ellen Post (Abt); Dr. Henry Roman (IEc); Ms. Liza Ryan (IEc); Mr. Jim Wilson (Pechan Avanti); Dr. Leland Deck (Abt).

Meeting Summary:

The discussion generally followed the issues and general timing as presented in the meeting Agenda (see Meeting Agenda - Attachment C). The teleconference lasted until 1:00 pm. There were no written comments submitted to the Committee, and there were no written requests to present public comments during the discussion.

Welcome and Introductions - Dr. Paul Lioy, the Chair, opened the session at 1 a.m. welcoming members and consultants (Roster, Attachment A), and reviewed the agenda (Attachment C). Dr. Angela Nugent, Designated Federal Official (DFO) took roll.

Public Disclosure

The DFO informed listeners that the SAB has determined that this panel has no legal "conflicts of interest" with the issue being reviewed. She then asked the one panel member who had not participated in the June 22, 2001 teleconference call to introduce himself and give a brief description of how his background, experience and interests relate to the review of the 812 analytical blueprint.

Dr. Joseph Meyer stated that he was an Associate Professor at the University of Wyoming. He is currently doing research on the ecological effects of exposure to copper and nickel. He is working as a contractor for EPA to help develop aquatic life criteria for copper. He believes he has no activities that would interfere with his participation in Council activities.

Agency Overview of Material for Committee's Review and specifically "Human Health Effects Estimation"

Mr. DeMocker reiterated his appreciation for SAB advice and introduced members of the project team on the call. He described the engagement of members of the Agency in development of the analytical blueprint.

He emphasized key elements of the second prospective analysis that will change, including the following: (1) use of the Krewski reanalysis of Pope study data on premature mortality from exposure particulate matter (PM); (2) supplemental calculation of avoided short term mortality using the Schwartz et al. (1996) and Samet et al. (2000) studies; (3) substantial extension and updating of benefit analysis for Title 6 through use of the EPA's Atmospheric Health Effects Framework (AHEF).

Dr. Hopke questioned how the Agency would assess the impact of Agency regulations, since current court cases and policy indicate that the next coarse PM standard is not likely to be PM 10. How would the Agency characterize studies of exposure to PM10 and relate them to benefits associated with avoided morbidity? He suggested that to the extent that PM 10 serves as a basis for morbidity, that would call for clarification.

Dr. Lippmann asked about figure 1-1, "Proposed Analytic Sequence for Second Prospective Analysis" in the Blueprint. He stated that the diagram only included air quality modeling for Criteria Pollutants in the diagram. Mr. DeMocker acknowledged that the Agency is planning to model exposures for mercury as well. Dr. Lippmann asked for improvements in the figure.

Discussion of Agency's Proposed Approach to Assessing Human Health Effects

Dr. Lippmann referred panelists to his written comments (see Attachment D) on PM mortality. He called the use of the Krewski reanalysis "reasonable" and stated those additional research results, cited in his written comments, could be added, including impacts on infant mortality. Mr. DeMocker asked if there were any implications for the lag structure, if PM infant mortality or mortality in children. He suggested using the Woodruff study and new Kaiser study in a sensitivity analysis.

Dr. Lippmann also mentioned that there was new data on ozone exposures and mortality and offered to provide a copy of an article by Thurston and Ito, in press, to the Agency.

Dr. Philip Hopke expressed his general support for the approach in the analytical blueprint. Dr. Lioy supported using the American Lung study for ozone and capturing the number of Emergency Room visits, as well as admissions. Dr. Lippmann pointed out that ozone is clearly indicated in short term responses, but not implicated with impaired lung growth in children. Drs. Hopke and Lippmann expressed support for the use of PM as index; it is well correlated with impacts on children. Dr. Michael Kleinman asked whether this approach raised multiple pollutant issues. He is seeing some papers that indicate greater effects for mixtures of ozone and PM at levels where neither constituent has impact by itself. He suggested that planning for future analyses accommodate combined effects. Mr. DeMocker asked for quantitative documents and peer-reviewed documents on this point that the 812 Study might use. Dr. Lioy suggested that the Agency might add an additional uncertainty in current benefits assessments, due to the lack of methods to identify interactive effects; "we're underestimating effects, going chemical by chemical. "

Dr. Kleinman stated that research shows a relationship between ozone and changes in pulmonary function. Science can quantify it but not value it. In general, the research supports the argument that ozone and other pollutants have effects on the lung.

Dr. Hopke concluded the discussion of tropospheric ozone by suggesting that the Agency is now going to talk about beneficial effects of tropospheric ozone through reduced UV-b. He informed the group that CASAC looking at the issue this year. The offsets of reducing ozone is associated with a marginal increase of skin cancer rates and is "worth a mention."

The panel then turned to a discussion of chronic Asthma and other morbidity endpoints. and whether asthma health effects should be relegated to a sensitivity analysis. The Agency reported that the cost-of illness data for asthma attacks were old and not worthy of including. Mr. DeMocker and Dr. Hubbell reported that, in general, there is not a good match between the asthma attack endpoint as defined in key study and cost of illness study. They reported a similar issue for chronic bronchitis, where there is a mismatch between data on bronchitis generally and costs associated with severe attacks; in that case, they used an adjustment for severity. HEES members questioned whether there might be partial information that the Agency could use, acknowledge, as an underestimate, and use as a "spur to do more research." Dr. Bryan Hubbell also stated that the Agency does not have a "decent baseline for what people do for asthmatic kids," so that the Agency can estimate marginal costs. Dr. Lippmann suggested that Dr. Michael Lebowitz, who could not participate in the call, may have data relevant to this point. Ms. Chestnut asked about using as a lower bound for asthma the information used for other respiratory symptoms; the Agency responded that the lower bound could be misleading. Dr. Lioy concluded the discussion with the "general take-home message: quantitate wherever possible. Identify underestimates and use as spurs to research."

The panel then turned to a discussion of stratospheric ozone. Dr. Lioy stated that the model for stratospheric ozone should come to the Air Quality Modeling Subcommittee (AQMS)

for review. Mr. Frank Arnold briefly reviewed the AHEF model; he stated that the model has undergone extensive peer review in its use by NASA on the impacts of commercial- flying supersonic aircraft. There is available a paper on uncertainties available for review.

Dr. George Taylor then asked whether the review of amplification factors was the province of the AQMS or the HEES. Dr. Lioy responded that the model's linkages from ozone depleting substances, to depletion, to atmospheric column are the province of the AQMS, but the effects issues is the domain of the HEES. He acknowledged that an issue related to health effects is selection of the action spectrum. Measuring how much UV you get is modeling issue; but deciding what spectrum to model is an "effects question." Dr. Taylor stated that there was a substantial database on UV-b effects on natural resources.

Dr. Lioy also asked three other issues: (1) will there be performance checks evaluating how models perform?; (2) is the assumption of "no further depletion a good boundary condition?" The UN has suggested the peak is passed in terms of amount of depletion--is the model realistic? ; and (3) whether stratospheric ozone is being replenished and at what rate (2% /year; 5%/year). He suggested that these issues may justify a sensitivity analysis.

Dr. Tim Larson asked whether the modeling was restricted to the contiguous 48 states, even though effects are most pronounced at the poles. He suggested that Alaska should be included, and Dr. Lioy agreed, despite the sparse population exposed.

Dr. Kleinman served as lead discussant for the blueprint's discussion of Hazardous Air Pollutants (HAPs). He characterized the Agency's main issue as an inability to quantify benefits from preventing exposure from air toxics, because of a lack of data for exposure modeling and lack of information on concentration-response factors. Rather than "get discouraged," he suggested that the Agency again consider a "poster-boy approach" that selects a data-rich HAP and explicitly communicates that the Agency is not providing a complete picture. He reiterated the suggestion made in the June 22nd conference call that the Agency might glean information from the SAB's National Air Toxics Assessment draft report. Mr. DeMocker responded that he will check with staff in EPA's Office of Air Quality Protection and Standards to determine if they think there is merit in using the NATA approach to support bounding exercise. Dr. Kleinman reported that the SAB draft suggested benzene as a good potential model. Dr. Lippmann pointed out that HAPs could just provide a small marginal benefit, and might not be worth analysis. He referred to the exercise conducted in the retrospective report where "we couldn't number on the fingers on one hand credible cancers from NESHAPs. " He added that Congress wants best estimates. If those are not available for HAPs, the Agency might conduct upper- bound estimates and see if they still "might flunk" benefits-cost analysis. He agreed that benzene provided a rich data set. Mr. DeMocker agreed to consider issues involved in using benzene as a "poster child." These issues might include: (1) addressing the multi-title issue; (2) apportioning costs for benzene control; (3) addressing substitution effects for replacement of benzene in gasoline another material in its place; and (4) undertaking analysis where benefits are uncertain and costs low. Dr. Lioy emphasized the importance of making progress on HAPs analysis. Dr. Lippmann supported this approach and identified a "disconnect" between public perception of HAPs as a major problem, and the obligation he feels to "to lay out that benefits

are small; costs are identifiable; risks are really associated with PM and ozone." Dr. Lioy stated that workshops haven't solved problem of developing best estimates, and so the Agency might again consider an analysis similar to the one conducted for the retrospective study, where upper-bound estimates, based on IRIS values, were used.

Dr. Hubbell asked about noncancer risks. Dr. Lippmann and Lioy responded that while the Agency knows enough to say cancer risks are small, it doesn't know enough about non-cancer risks. Indeed the Agency should not say that HAPs are without hazard. Their non-cancer effects (neurobehavioral, developmental, immunological) are not well known.

Mr. DeMocker then revisited the issue of title-specific scenarios. If the Agency undertook the approach suggested for air toxics, depending on how one structured the analysis, he didn't believe that results would be compelling for Title 3. Depending on how the analysis was structured, if you turn off Title 3, you would still need to meet Title 1 requirements because of rate-of-progress requirements. Dr. Lioy responded that the analysis should show that if you are looking at cumulative health risks, that's where ozone and PM are dominant factors.

Discussion of Agency's Proposed Approach to Ecological effects

Mr. DeMocker briefly reviewed the Agency's proposed approach for characterizing ecological benefits. The approach involves three steps regarding ecological systems (1) review of the literature of effects of air pollutants on ecological systems; (2) identification of the subset of ecological effects amenable to some sort of economic interpretation; and (3) exploration of methods for economic modeling for selected physical effects. He stated that the project team would explore the literature on modeling economic systems and specifically mentioned the work of Nancy Bockstael & Robert Costanza on the Patuxent estuary. Mr. DeMocker also stated that he would update the work on nitrogen deposition analysis, because of recent work on Nitrogen deposition in coastal estuaries. Dr. Kleinman enquired whether EPA had seen research sponsored by the California Air Resource Board on acid deposition. He offered to provide this material to the project team.

Dr. George Taylor led off the general discussion with the comment that the "larger issue" is ecological services, not natural resources, which are more amenable to economic analysis. He suggested making a distinction in the title of the chapter and in the text between how the agency addresses natural resources vs. ecological services. He advised increased recognition of ecological services flows, and endorsed the Agency's exploration of Costanza's approach. He predicted that "people will be surprised by the amount of benefit derived" and that the approach may be unsettling for economists. He suggested that Chapter 9 provide a separate section on uncertainties that identifies lack of characterization of ecological service flows as an uncertainty where the "direction is known with certainty; magnitude is not known." He also commented that Appendix C provides no C-R functions for natural resources. He committed to provide information on C-R functions for ecological effects in writing. Dr. Taylor then enquired whether air quality modeling for Nitrogen deposition is for wet or dry nitrogen. Dr. Bryan Hubbell responded that the REMSAD Version 6 model incorporated information on both wet and dry

Nitrogen.

Dr. Joseph Meyer stated that he "wholeheartedly supports" what Mr. DeMocker stated in the conference call vs. the approach detailed in the Analytical Blueprint. He enquired whether the Agency will actually conduct a Constanza-like analysis or just explore the method. Mr. DeMocker responded that he will review the approach and may conduct some exploratory monetary calculations; he is not sure about strengths of data and methods. Dr. Meyer enquired whether there might be some way to prepare the Council for the discussion of the Bockstael-Costanza approach, since it is so new. Dr. Nugent agreed to work with Dr. Chestnut to alert Dr. Trudy Cameron, chair of the Council, about this issue.

Mr. DeMocker drew the HEES members' attention to Key Specific Question 11. He requested advice on whether REMSAD model's treatment of ozone-mercury transport and deposition was appropriate for ecological effects. He asked for guidance on ecosystem effects of mercury and its impact on food web.

Discussion of Results Aggregation and Uncertainties They Relate to estimates of Health and Ecological Effects

Dr. Lippmann began the discussion by referring the participants to his written comments, especially suggestions for improvements to the treatment of air toxics in Table 9-1. Dr. George Taylor added his suggestion that the table include a separate section on natural resources and ecological services. He added that the Chapter might be the place to do a benefits assessment or sensitivity analysis relying on the Costanza approach.

Dr. Lioy discussed the need for the Chapter to address "performance and testing" issues based on 10 years' experience with implementation of the Clean Air Act Amendments. He expected that Agency would see reductions in emissions and ambient air concentrations, and recommended that the analysis include range-finding estimates to validate predictions. Dr. Larsen commented that PM trends across country may be used to test consistency with predictions. Dr. Lioy commented that "we didn't predict ozone effects associated with SUVs.". Mr. DeMocker responded that the Agency "many things are amenable for review for a quality purpose." EPA is proposing to refine base-year emissions inventories. Ms. Chestnut agreed that validation is appropriate, and added that there will always be a significant amount of uncertainty in the comparison between prospective assumptions and the counterfactual case. Mr. DeMocker agreed with this point and mentioned that the Agency does now how 1999 and 1996 emissions inventories to refine the 1990 base year inventory. Dr. Lioy identified a need to revise language in Table 9-1, page 9-7; models don't reduce uncertainties – they change uncertainties. Dr. Kleinman questioned C-R relationships and how the Agency is going to "deal with kids." Mr. DeMocker responded that there were a number of endpoints that focus on kids and that he would provide that information.

Preparation of Draft Report

Members to provide written responses on assigned topics to Angela Nugent no later than

July 2, so that she can synthesize response for review by Dr. Lioy and presentation by him at the July 9-10 Council meeting.

Action items:

1. Dr. Lippmann to provide a copy of an article on ozone exposures and mortality by Thurston and Ito in press to the Agency.
2. Mr. DeMocker to bring the AHEF model to the AQMS for review
3. Mr. DeMocker to consult with OAQPS staff to determine if they believe there is merit in using the NATA approach to support bounding exercise for HAPs
4. Dr. Nugent to work with Dr. Chestnut to alert Dr. Trudy Cameron, chair of the Council, about the discussion of the Bockstael-Costanza approach.
5. Dr. Kleinman to provide information on research sponsored by the California Air Resource Board on acid deposition.
6. Mr. DeMocker to provide information, by July 5 on C-R relationships and how the Agency is going to "deal with kids."
7. Members to provide written responses on assigned topics to Angela Nugent no later than July 2, so that she can synthesize response for review by Dr. Lioy and presentation by him at the July 9-10 Council meeting.

At 1:00 p.m., Dr. Lioy adjourned the teleconference.

Respectfully Submitted:

Designated Federal Official

Certified as True:

Chair

NOTE AND DISCLAIMER: The minutes of this public meeting reflect diverse ideas and suggestions offered by the Council members and consultants (M/C) to the Agency during the course of deliberations within the meeting. Such ideas, suggestions and deliberations do not necessarily reflect definitive consensus advice from the Council M/C. The reader is cautioned to not rely on the minutes to represent final, approved, consensus advice and recommendations offered to the Agency. Such advice and recommendations may be found in the final advisories, commentaries, letters, or reports prepared and transmitted to the EPA Administrator following the public meetings.